

GUIDELINES FOR THE SLAUGHTER OF
FARMED FISH FOR HUMAN CONSUMPTION

Article 1

1. General principles for slaughter

These guidelines address the need to ensure the welfare of *fish* during pre-slaughter and slaughter processes, until they are dead.

These guidelines apply to those *fish* species that are commonly slaughtered in *fish* slaughterhouses. Other *aquatic animals*, wherever they have been reared, should be managed to ensure that their transport and slaughter/*killing* is carried out without causing undue stress to such animals; the principles underpinning these guidelines also apply to those animals.

2. Personnel

Persons engaged in the unloading, moving, handling, *stunning* and slaughter of *fish* play an important role in their welfare. Personnel handling *fish* for slaughter should be experienced and competent in the transport and handling of *fish*, and understand their behaviour patterns as well as the underlying principles necessary to carry out their tasks. They should also be familiar with these guidelines and the applicable legislation.

The management of the *fish* slaughterhouse and the *Competent Authority* should together ensure that these persons carry out their tasks in accordance with the principles of *aquatic animal* welfare.

Article 2

Transport of fish for slaughter

Fish for slaughter for human consumption should be transported to *fish* slaughterhouses in accordance with Chapter X.X.X on the Guidelines on the transport of *fish*.

Article 3

Design of facilities for holding fish prior to slaughter

1. The holding facilities should be designed and constructed to hold the maximum number of *fish* in relation to the throughput of the slaughterhouse without compromising the welfare of the *fish*.
2. In order to permit operations to be conducted as smoothly and efficiently as possible without injury or undue stress to the *fish*, the facilities should be of a size that allows the

fish to move freely in the required direction, using their behavioural characteristics.

3. The following guidelines may help to achieve this:

a) Nets and holding tanks

- i) The design of containment or crowding nets should avoid corners or folds, pockets or traps.
- ii) Containment nets should not cause injury and should be of appropriate mesh size and type.
- iii) Nets and tanks should generally be circular or of sufficient size, and constructed of suitable materials to allow a continuous forward swimming direction with minimal risk of injury.
- iv) Areas or zones of turbulence should be minimised or eliminated.

b) Water

Water quality should be appropriate regarding the density and species of *fish*.

c) Sensory stimulation

- i) Lighting should encourage the movement of *fish* in the correct direction, by avoiding bright lights and reflective surfaces facing *fish*.
- ii) Undue noise should be minimised.

d) Systems for moving *fish*, including pumps and pipes

- i) For optimum welfare, *fish* should be pumped in a continuous flow from source to destination.
- ii) Pumps should have a capacity to produce a flow sufficient to ensure movement of *fish* in correct direction; areas of turbulence should be avoided.
- iii) There should be a contingency plan in place in case pumping ceases, to avoid exposing *fish* to low oxygen or other factors which could compromise their welfare.

- iv) Materials used in construction should provide smooth contact surfaces and should not contain protrusions which may injure *fish*; all bends, entries and exits should be designed to allow smooth unobstructed flow of *fish* and water.
- v) *Fish* should not drop onto hard surfaces at points of exit.
- vi) Pipes should be of appropriate diameter and flow of sufficient strength to prevent *fish* being trapped.
- vii) Brailing devices (used to haul *fish* into boats), if used, should contain an adequate volume of water in proportion to the number of *fish*, to maintain *fish* welfare.

Article 4

Unloading and moving *fish* in slaughterhouses

1. *Fish* should be transported for slaughter in a way that minimises adverse *fish* health and welfare outcomes and the transport should be carried out in accordance with the OIE Guidelines for the transport of *fish*.
2. The following principles should apply to the unloading and moving of *fish* in the slaughterhouse:
 - a) The welfare of the *fish* and their environment should be assessed on arrival prior to unloading, and corrective action taken as appropriate.
 - b) Management procedures should be in place to ensure that suitable environmental conditions are maintained within the holding and moving systems.
 - c) Injured or sick *fish* should be separated and killed humanely.
 - d) Sedation, where approved for *fish* for human consumption, may be used to minimise the stress associated with the movement or crowding of *fish*.
 - e) The crowding period prior to slaughter should be as short as possible, and preferably the *fish* should be subject to crowding conditions once only.
 - f) Physical, mechanical or manual handling of *fish* should be minimised.
 - g) Where possible, *fish* should be allowed to swim directly into a percussive stunning device (without handling) to avoid handling stress.

Article 5

Summary of acceptable stunning methods for fish and their respective welfare issues

<i>Stunning method</i>	<i>Fish welfare concerns / implications</i>	<i>Applicable species</i>
<i>Percussive stunning</i>	<i>Hand operated equipment may be hampered by uncontrolled movement of the fish. Unconsciousness may not be achieved due to a too weak blow to the head. Injuries may occur.</i>	<i>Salmonids Halibut</i>
<i>Spiking (Iki-Jime)</i>	<i>Inaccurate application may cause injuries. May be hampered by uncontrolled movement of the fish. Difficult to apply.</i>	<i>Salmonids Tuna</i>
<i>Electrical stunning</i>	<i>Difficult to control and apply correctly in the field. Optimal control parameters unknown. May be hazardous to operating personnel.</i>	<i>Salmonids</i>
<i>Free bullet</i>	<i>Shooting distance; calibre. Noise of guns may cause stress reaction. May be hazardous for operating personnel.</i>	<i>Tuna</i>

Note: A key *fish* welfare requirement is the competence of the personnel carrying out the *stunning* methods.

Stunning methods

1. General considerations

For details on *stunning* methods, see Appendix X.X.X. on the Guidelines for the *humane killing of fish* for disease control purposes.

The *Competent Authority* should regularly ensure the appropriateness and effectiveness of the *stunning* equipment and process, and that the operators are competent to humanely kill *fish*. The responsibility for operator competence lies with the management of the *fish* slaughterhouse.

If *fish* are removed from the water, *stunning* should take place as soon as possible (preferably within 5–10 seconds).

The equipment used for *stunning* should be maintained, adjusted and operated in accordance with the recommendations of the manufacturer. It should be tested on a regular basis to ensure that performance is adequate.

Bleeding should only be performed on *fish* which are effectively stunned.

Stunning should not take place if slaughter is likely to be delayed.

When killing novel *fish* species, it is important to obtain information on the exact location of the brain and *Medulla oblongata* in order to target the *stunning* correctly to the head.

Signs of correct *stunning* include:

- a) immediate loss of respiratory movement (loss in opercular activity);
- b) loss of *visual evoked response* (VER);
- c) immediate loss of vestibulo-ocular reflex (VOR, eye rolling);
- d) loss of tail reflex and muscular movements.

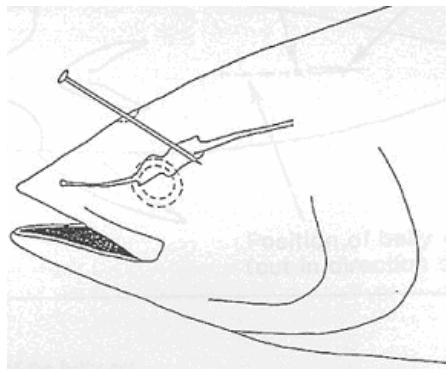
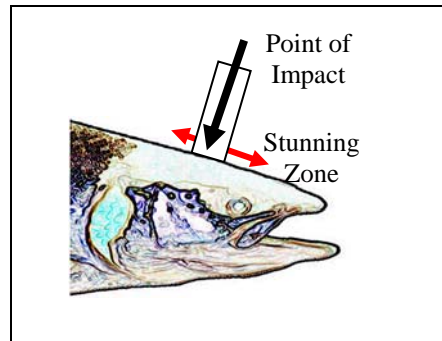
2. Mechanical stunning

Percussive *stunning* is achieved by a blow of sufficient strength to the head applied above or immediately adjacent to the brain in order to damage the brain.

Spiking, coring or Iki-jime are irreversible killing methods for *fish* based on physical damage to the brain by inserting a spike into the brain either manually or using specially

developed equipment to destroy sensory and motor functions in large *fish*. The so-called captive needle stun is a modification of spiking.

Mechanical *stunning* is an irreversible method in more than 99% of the cases if correctly applied. If stunned *fish* show recovery of reflexes or motor function, the *fish* should be re-stunned.



Spiking of tuna

3. Electrical stunning

Electrical *stunning* involves the application of an electrical current of sufficient strength, frequency and duration to cause immediate unconsciousness.

An electrical *stunning* device should be used in accordance with the following principles:

- a) The operators should be competent in applying the method properly.
- b) The electrical *stunning* device should be constructed and used for the specific *fish* species and their environment.

- c) It should be ensured that heads of the *fish* are confined beneath the surface of the water, and that there is a uniform distribution of electrical current in the stun tank or chamber.
- d) The equipment used for *stunning* should be maintained and operated in accordance with the manufacturer's recommendations, and it should be tested on a regular basis to ensure that the power output is adequate.
- e) An effective stun and kill should be verified by the absence of consciousness. For signs of correct *stunning*, see description under mechanical *stunning* above. Eels are reported to be somewhat resistant to electrical *stunning*.
- f) Appropriate protective clothing (including rubber gloves and boots) should be worn.
- g) The voltage in the stun must be of suitable conductivity.

Article 7

Summary of methods other than stunning used for the sedation, anaesthesia or immobilisation of fish

<i>Method</i>	<i>Application /effect</i>	<i>Fish welfare concerns / implications</i>	<i>Key fish welfare requirements</i>	<i>Applicable species</i>
<i>Live chilling</i>	<i>Recoverable immobilisation prior to stunning / slaughter.</i>	<i>Fish have not lost sensation. Season and species dependent.</i>	<i>Competent personnel and suitable control equipment/process</i>	<i>Salmonids / cod/ wolffish / halibut</i>
<i>Aqui-S</i>	<i>Recoverable sedation/anaesthesia prior to stunning / slaughter.</i>	<i>Fish may recover sensation prior to slaughter.</i>	<i>Control of dose. Competent personnel</i>	<i>Most fish species</i>
<i>CO₂</i>	<i>Recoverable immobilisation prior to stunning / slaughter.</i>	<i>Aversive. Fish become exhausted and die due to hypoxia and suffocation.</i> <i>Fish may not lose sensation</i>	<i>Competent personnel</i>	<i>Most fish species</i>
<i>Combination of CO₂/O₂ - Live chilling</i>	<i>Recoverable immobilisation prior to stunning /</i>	<i>Aversive. Fish may not lose sensation. Season and species</i>	<i>Competent personnel</i>	<i>Salmonids</i>

	<i>slaughter</i>	<i>dependant.</i>		
<i>Electrical harpoon</i>	<i>Irrecoverable electrocution applied to the head prior to slaughter.</i>	<i>Good accuracy required to ensure fish killed</i>	<i>Competent personnel</i>	<i>Large tuna</i>

For more details on methods, see the guidelines on killing of *fish* for disease control purposes.

Article 8

Unacceptable methods, procedures or practices on fish welfare grounds

The following methods are not considered acceptable for anaesthetising *fish* on welfare grounds:

1. CO₂ is not acceptable for the mass killing of *fish*, due to its aversive effects.
2. Live chilling/CO₂ is not acceptable for the mass killing of *fish*, due to its aversive effects.
3. Salt or ammonia baths are not acceptable due to their aversive effects on *fish*.
4. Asphyxiation is not acceptable as sensation is not lost during the slow induction.
5. Exsanguination is not acceptable for the killing of conscious *fish*.
6. Accidental pre-stun electrical shocks as inadequate current and voltage gives recovery of consciousness.